Allied Fibers

Allied-Signal Inc.
Allied Fibers Division
Margaret & Bermuda Streets
Philadelphia, PA 19137-1193
Telephone (215) 533-3000

Allied Signal

September 4, 1991

Ms. Sharon Harless
PA/DC Permits Section
U.S. Environmental Protection Agency
Region III
841 Chestnut Street
Philadelphia, PA 19107

Subject: RCRA Facility Investigation (RFI) Plan
Submittal of Revised Sections

Dear Ms. Harless:

Enclosed please find four (4) copies of revised sections of the RFI Plan, Volume 2 of 3, prepared in response to EPA comments contained in your July 24, 1991 letter to Allied-Signal Inc. The revisions have been prepared by HALLIBURTON NUS Environmental Corporation on behalf of Allied-Signal Inc. Because the revisions to the text have been limited to only five sections in the RFI Plan Volume 2 of 3, only these sections have been revised and reissued. Specifically, portions of the following sections in the RFI Plan, Volume 2 of 3 have been revised:

- Table of Contents
- Section 2.0 - Field Investigation Technical Approach
- Section 3.0 - Quality Assurance Objectives
- Section 4.0 - Field Investigation Activities
- Section 7.0 - Analytical Procedures
- Section 9.0 - Internal Quality Control Checks

The revised sections have been labeled with a revision number and date on each page, and should be inserted into the May 10, 1991 version of the RFI Plan, Volume 2 of 3. There are no revisions to the RFI Plan, Volumes 1 and 3.

The following are responses to each of the EPA's comments on the RFI Plan, explaining how each comment was addressed.

Study Area 1

1. The analytical data from samples collected on September 28, 1990 from the cumene recovery wells will be validated during the Phase I RFI. If the data cannot be validated

Study Area 1 (Continued)

to Superfund DQO Level 3 quality standards, resampling of these wells during Phase II of the RFI will be considered. Section 2.2 in the text has been modified accordingly.

2. The September 27, 1990 analytical data from the caustic recovery wells will also be validated during Phase I of the RFI. If validation indicates that the data quality is inadequate, resampling of these wells during Phase II of the RFI will be considered. Section 2.2 of the text has been modified accordingly.

3. Grain size analyses will be performed on five unsaturated soil samples and five saturated soil samples collected during the Phase I RFI. Section 2, 3, 4, 7 and 9 of the text have been modified accordingly.

4. The purpose and goals of the cumene and caustic recovery systems are described on pages 2-19 through 2-21 of Volume 1 of the RFI Plan. Final recovery system criteria will be defined as part of the RFI/CMS process.

Study Areas 2, 3 & 4

1. Since Study Areas 2 and 3 are capped, significant erosion and transport of soils during flooding is precluded. Therefore, presence of these areas in the 100-year floodplain has not influenced the Phase I RFI sampling program. Sections 2.3 and 2.4 have been modified to clarify this point.

2. Soil samples will generally be taken from each boring when the HNU screening levels are highest (unless visual observations suggest an alternate sampling horizon). Sections 2.3, 2.4 and 2.5 in the text have been clarified accordingly.

The QA/QC Plan

1. Both filtered and unfiltered groundwater samples will be analyzed for heavy metals during the Phase I RFI. Sections 2 and 3 of the text have been modified accordingly.

2. The qualifications of the QA Officer for the Phase I RFI are attached.

In addition, the EPA (in Section II of their July 24, 1991 letter) asked that several pieces of information be provided in the Phase I RFI report. This information will be provided in the report to the extent possible.

Should you have any comments or questions concerning the RFI Plan revisions, please contact me at 533-3000, or Mr. John Trepanowski of HALLIBURTON NUS Environmental Corporation at 971-0900.

Very truly yours,

B. E. Flowers

B. E. FLOWERS

BEF:gpw
Attachment

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TABLE 2-1

RFI SCOPING MATRIX
ALLIED FIBERS FRANKFORD PLANT
PHILADELPHIA, PENNSYLVANIA

Suggested Study Area	SWMU/ AOC No(s)	SWMU/AOC Name	Suspected Contaminants or Source	Existing Contaminant Data	RFI Phase I Approach	RFI Phase I Analytical Scheme
1	AOC-1	Groundwater Recovery Wells	Cumene, Other Organics, Selected Metals	Two sample rounds of floating product (cumene). One sample round from recovery wells. Data indicate groundwater contamination.	1) Inspect existing wells for usability. These include wells B1A, B2, B3, and B4 in the Unit 2 process area and the caustic spill area wells. 2) Continuously sample 12 soil borings to collect geological information, define the extent of the floating product layer (LNAPL) and generate estimates of product thickness. Field screen samples visually and with an HNU. 3) Install and collect samples from three stainless steel monitoring wells screened across the uppermost water-bearing zone. These wells will be located as follows: - 1 well upgradient of the LNAPL area - 2 wells downgradient of the LNAPL area 4) Perform slug tests on new wells. 5) Install 2 staff gages in Frankford Inlet. 6) Survey and obtain water levels from all usable wells. 7) Validate existing data from recovery wells.	Groundwater Analyses: Target Compound List (TCL) volatiles, semivolatiles, and pesticide/PCBs; Target Analyte List (TAL) metals; Appendix IX organophosphorus pesticides, herbicides, and dioxin screen; and TOC. Both dissolved (field-filtered) and total (unfiltered) aliquots will be analyzed for TAL metals. Three samples (exclusive of QA/QC samples) total. Soil Analyses: One saturated and one unsaturated soil sample to be analyzed for grain size distribution.
	46	Phenol Water System	None. EPA suspects leaks occurred in the past.			

TABLE 2-1
RFI SCOPING MATRIX
ALLIED FIBERS FRANKFORD PLANT
PHILADELPHIA, PENNSYLVANIA
PAGE TWO

Suggested Study Area	SWMU/ AOC No(s)	SWMU/AOC Name	Suspected Contaminants or Source	Existing Contaminant Data	RFI Phase I Approach	RFI Phase I Analytical Scheme
2	AOC-2	Naphthalene-contaminated soil	Naphthalene	None	Continuously sample 20 soil borings to collect geological information. Collect 1 subsurface sample from the borings every 5 feet, basing the sample interval on visual observation and field screening with an HNU. Borings will be located as follows: - 5 borings in former creekbed - 2 borings outside creekbed in meander - 3 borings in naphthalene-contaminated soil area - 5 borings in Landfill A area - 5 borings in Landfill B area	Soil Analyses: TCL volatiles and semivolatiles; and TOC. 40 samples total (exclusive of QA/QC). Analyze 2 unsaturated and 2 saturated soil samples for grain size distribution.
	11	Past Landfill Area A	Maleic Acid, Phthalic Acid	None		
	12	Past Landfill Area B	Naphthalene	None		
	42	Former Creekbed	Naphthalene	Excavated materials from area had organic odors.		
3	19, 20, 21 and 30	Dephenolizer I Area	Phenol, Acetone, Naphthalene	None. EPA suspects leaks occurred in the past.	Continuously sample 8 soil borings to collect geologic information. Collect 1 subsurface sample per boring, based on visual observation and field screening with an HNU. Borings would be located as follows: - 5 borings in Dephenolizer I area - 3 borings in Naphthalene Tank Bottoms area	Soil Analyses: TCL volatiles and semivolatiles; and TOC. 8 samples total (exclusive of QA/QC). Analyze 1 unsaturated and 1 saturated soil sample for grain size distribution.
	49	Naphthalene Tank Bottoms	Naphthalene	None		

TABLE 2-1
RFI SCOPING MATRIX
ALLIED FIBERS FRANKFORD PLANT
PHILADELPHIA, PENNSYLVANIA
PAGE THREE

Suggested Study Area	SWMU/ AOC No(s)	SWMU/AOC Name	Suspected Contaminants or Source	Existing Contaminant Data	RFI Phase I Approach	RFI Phase I Analytical Scheme
4	2	Existing Nonhazardous Waste Drum Storage Area	Leaking Drum Contents	None	Continuously sample 9 soil borings to collect geological information. Collect 1 subsurface sample per boring, based on visual observation and field screening with an HNU. Borings would be located as follows: - 3 borings in Existing Nonhazardous Waste Drum Storage Area - 3 borings in Past Drum Storage Facility C - 3 borings in Past Drum Storage Facility E	Soil Analyses: TCL volatiles and semivolatiles; and TOC. 9 samples total (exclusive of QA/QC). Analyze 1 unsaturated and 1 saturated soil sample for grain size distribution.
	3	Past Drum Storage Facility C	Leaking Drum Contents	None		
	5	Past Drum Storage Facility E	Leaking Drum Contents	None		

- Well number.
- Well security (locked/unlocked).
- Condition of well casing and protective casing (if any).
- Well casing material.
- Size of well casing.
- Depth to groundwater.
- Total depth of the well.
- Identification and depth determination of any obstructions within the well.

In addition to the above-listed observations, any other pertinent observations that may be identified will be noted. The observed condition of the well will be compared with the original well logs, if available. Based on the field observations and on background information available, the existing wells will be evaluated as to their potential usefulness as water-level measurement points. All usable wells will be integrated into the water-level measurement program.

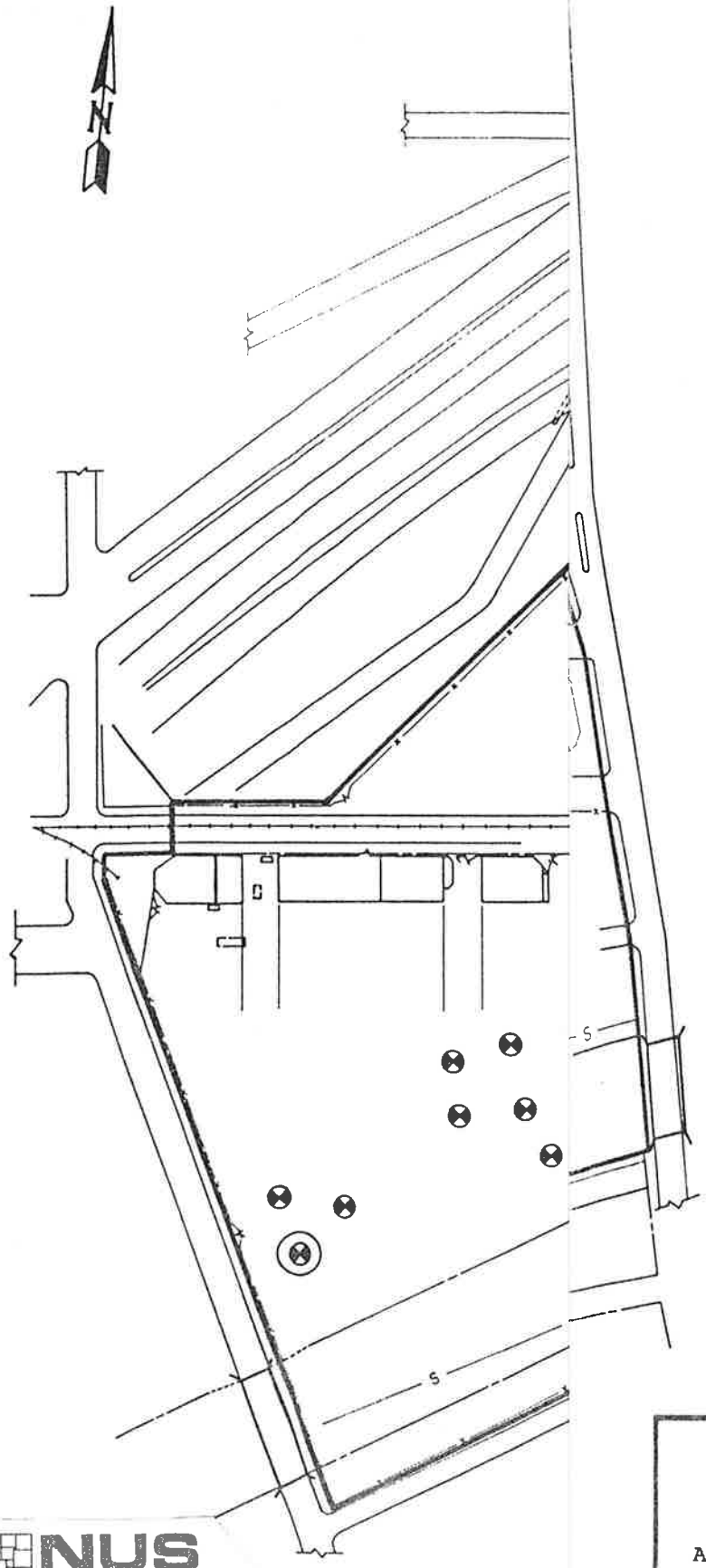
During the well evaluation program, the closure status of those wells not located or determined to be unusable will also be noted.

The existing surface cover in Study Area 1 will be visually verified during Phase I. A map of the surface cover will be presented in the Phase I RFI report.

Once these preliminary activities have been completed, soil borings will be advanced in Study Area 1 to delineate the extent of the LNAPL present there. Each soil boring will be advanced and sampled continuously until the water table is encountered. Estimates of product thickness at each location will be made, based on visual observations. The soil boring program in Study Area 1 will be continued until the extent of the floating product layer is established (i.e., until no immiscible layer is encountered in the borings) in all directions. Each new soil boring location will be determined in the field, based on observations made at the previous boring location(s). An estimated 12 soil borings will be required to delineate the LNAPL areal extent. Tentative soil boring locations are presented on Figure 2-1. Soil boring procedures are described in Section 4.0.

Soil samples will be field screened visually and with an HNU. Since the makeup of the floating layer (predominantly cumene - see Section 4.0 of Volume I) has been established, no soil samples will be submitted for chemical analysis. The LNAPL areal extent and product thicknesses measured during the soil boring program will be used to estimate the volume of LNAPL present in Study Area 1.

One of the Study Area 1 borings will be advanced until bedrock is encountered to facilitate cross-section preparation (see Figure 2-1). One saturated and one unsaturated soil sample from this boring will be analyzed for grain size distribution.



LEGEND

Study Area 1

- Proposed Monitoring Well Locations
- Proposed Soil Borings and Field Screening

Study Area 2

- Proposed Soil Borings and Field Screening

Study Area 3

- Proposed Soil Borings and Field Screening

Study Area 4

- Proposed Soil Borings and Field Screening

Notes:

Several of the Former Creek Bed Borings may also be used to define LNAPL extent in Study Area 1. Borings at circled locations will be advanced to bedrock.

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FIGURE 2-1

Proposed Sampling Locations

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Once the LNAPL areal extent has been established, three two-inch-diameter, stainless-steel monitoring wells will be installed to monitor the uppermost water-bearing zone. Two wells will be located southeast of the LNAPL area, whereas the third well will be located northwest of this area. Groundwater flow directions at the site have not been established. Barring man-made influences, shallow groundwater would be expected to flow to the southeast (towards the Frankford Inlet and the Delaware River). Thus, the southeast and northwest directions have been picked because they represent apparent downgradient and upgradient locations, respectively. Tentative well locations are shown on Figure 2-1. Drilling and well construction procedures for the Phase I monitoring wells are described in Section 4.0.

The rationale for installing only three monitoring wells during Phase I is that three monitoring wells are required to establish groundwater flow direction. Establishment of shallow groundwater flow direction(s) is a primary objective of the Phase I scope of work for Study Area 1. Since the man-made influences on groundwater flow (e.g., the groundwater pumping system) have not been defined, installation of more wells during Phase I could result in the installation of wells with little overall value (e.g., cross-gradient wells).

No deeper wells (e.g., wells that monitor the Farrington sand aquifer or the bedrock beneath the site) are proposed for Phase I. This decision was made, since the need for deeper monitoring wells has not been established, and data on shallow groundwater flow direction is desired beforehand to site deeper wells.

The three newly installed monitoring wells will be sampled and analyzed for those analytes shown on Table 2-1. Samples from the newly installed wells are expected to be somewhat turbid. For metals analysis, both field-filtered and unfiltered samples will be analyzed. Dioxin in groundwater samples from these wells will be analyzed using dioxin screening method SW 8270. This is considered sufficient because the Frankford Plant did not use or produce significant quantities of chlorinated organics. Samples from each well will also be analyzed in the field for dissolved oxygen, Eh, pH, specific conductance, and temperature. These parameters serve to characterize chemical and hydrogeological characteristics of the groundwater and aquifer as well as providing information on the chemical state, toxicity, treatability, and/or fate and transport of contaminants. Details regarding sampling activities are presented in Section 4.0.

Sampling and analysis of the existing cumene and caustic recovery wells is not proposed, since samples from these wells were recently (September 1990) analyzed using EPA methods (see Section 4.0 of Volume I of this RFI Plan). These analytical data will be validated as part of the Phase I RFI. If

the quality of these data is inadequate, resampling of these wells during Phase II of the RFI will be considered.

The new monitoring wells will be slug tested to determine the hydraulic characteristics of the water-bearing zones investigated by each well. The data generated from these tests will be used to assist definition of the water-yielding characteristics of the screened zone, to develop groundwater velocity values, and to estimate the rate of groundwater movement for the aquifer in the vicinity of the monitoring well being tested. Details on the slug test procedures are presented in Section 4.0.

A comprehensive water-level monitoring program will also be conducted as part of the aquifer testing scheme. Groundwater elevations beneath the Allied Frankford Plant are expected to vary significantly over time because of rising and falling tides in Frankford Inlet and the on-off cycling of the groundwater recovery wells. Because of this expected variation, a 7-day water level monitoring program has been developed. To supplement the monitoring well/recovery well/piezometer network, two staff gages will be placed in Frankford Inlet, one at the City of Philadelphia combined sewer outfall, and one at the southeastern edge of the Allied property.

Data from the water-level monitoring program will be used to develop overall groundwater flow directions, gradients, flow rates, and velocities. Details on this program are presented in Section 4.0.

The combination of the soil boring visual observations, water quality data, slug testing data, grain size distribution data, and water-level monitoring data will provide information to determine the areal extent and volume of LNAPL present, determine the horizontal extent of contamination, estimate loading rates to Frankford Inlet, evaluate the effectiveness of the existing pump-and-treat program in containing groundwater contamination, and assess infiltration (if any) into the city sewer system.

No investigation of the phenol water system is planned because all underground piping carrying continuous flows is being abandoned and replaced with overhead lines. An investigation of this system would not provide significant useful results. Details on the underground piping retirement program, including the program schedule, are contained in Appendix A of Volume I of this RFI Plan.

2.3 STUDY AREA 2 APPROACH

Study Area 2 is made up of the Naphthalene-Contaminated Soil area (AOC-2), Past Landfill Area A (SWMU 11), Past Landfill Area B (SWMU 12), and the Former Creekbed (SWMU 42). Naphthalene-

contaminated soil was identified by Allied during the construction of a loading area at AOC-2. Soil visually observed to be contaminated was excavated and disposed off site in a secure landfill. The degree that soil contamination was removed from this area was not established, as no soil sampling was conducted during the excavation/disposal program.

Past Landfills A and B were reportedly used for the temporary storage of phthalic anhydride mother liquors during strikes in 1960 and 1966. Reportedly, the mother liquor was excavated and disposed off site once the strikes were concluded. The effectiveness of the excavation/disposal program is not documented. Also, it was reported in the RFA that tank cleanout materials, including tar acid, naphthalene, and tar base sludges, were placed in Past Landfill B. No environmental sampling has been conducted in these areas to date.

In the 1950s the Frankford Creek meander on the Allied property was filled in. The exact nature of the fill materials is unknown but may have included City of Philadelphia incinerator ash and various coal tar materials. Part of this fill was removed when a sewer line was constructed across this area. A drum storage area (the drums may have been empty) located just east of the creek meander was noted on a 1937 aerial photograph.

No environmental sampling has been conducted at this unit. Contaminant-like odors were noted during an excavation at SWMU 42 in 1986.

Because the presence of significant contamination associated with the SWMUs/AOCs making up Study Area 2 has not been established, a limited subsurface soil sampling program is proposed for this area. (The surface in this area is capped with asphalt, cement, or gravel. Because of this capping, the partial presence of Study Area 2 in the 100-year floodplain has no significant influence on contaminant transport and the sampling program.) This program will be roughly equivalent to the Verification Investigations cited in the USEPA RCRA Corrective Action Permit for the Allied Frankford Plant. (The USEPA has also referred to these as "verification studies" and "confirmation studies" at other sites.) The need for further investigation (groundwater plume or further source delineation) in this area will be determined based on an analysis of Phase I RFI results.

The general approach for the Study Area 2 Phase I investigation will be to advance a predetermined number of soil borings into the subsurface beneath each SWMU/AOC down to the groundwater table (or bedrock, in the unlikely event bedrock is encountered before groundwater). Soil samples will be obtained continuously throughout the drilling process, using a split-spoon sampler. Samples for chemical analysis will be collected from the unsaturated zone at a frequency of once per every 5 feet of boring depth. Samples will be collected directly from the split spoon. The samples selected for

chemical analysis will be based on visual observations and field screening with a photoionization detector (HNU). If visual contamination or positive HNU readings are noted in a soil horizon, that horizon will be sampled. If no visually contaminated soil is encountered or HNU readings observed, the sample will be collected from the bottom of the sampling interval (e.g., at a depth of 5 feet or immediately above the top of the water table).

Because the exact locations of Past Landfill Areas A and B are not readily evident today (they have been covered by asphalt and gravel), five soil borings each are proposed for these areas. The excavation locations will be identified iteratively, based on observations made in previous excavations. Tentative excavation locations are shown on Figure 2-1. Since the location of AOC-2 is known, only 3 borings in this area are proposed. Five test borings are proposed for the former creekbed, since the creekbed covers a wide areal extent. Additionally, two borings outside of the creekbed are proposed to establish "baseline" soil conditions in this area.

The soil samples will be analyzed for TCL volatiles and semivolatiles; and total organic carbon (TOC). Additionally, the analytical laboratory will be instructed to look for cumene and alpha-methylstyrene (AMS) as part of their volatile analysis. TOC was selected as an analyte, as it will be used to estimate the mobility of contamination (if any) found in the soil samples. Soil samples will also be analyzed in the field for pH.

Two of the Study Area 2 borings will be advanced until bedrock is encountered to facilitate cross-section preparation (see Fig. 2-1). One saturated and one unsaturated soil sample from each boring will be analyzed for grain size distribution.

Section 3.0 provides additional details regarding proposed analyses for the soil samples obtained from each SWMU/AOC. Section 4.0 describes general drilling and sampling procedures.

2.4 STUDY AREA 3 APPROACH

Study Area 3 consists of the Dephenolizer I Area (SWMUs 19, 20, 21, and 30) and Naphthalene Tank Bottoms (SWMU 49). The Dephenolizer I Area consists of the former dephenolizer and 3 storage tanks. One of the storage tanks reportedly leaked. Drums of refined naphthalene were also stored in this area, according to a 1916 map. At SWMU 49, less than 200 cubic yards of naphthalene tank bottoms were reportedly spread upon the ground and graded during tank demolition activities. Also, drums were stored at and adjacent to SWMU 49, according to a 1937 aerial photograph. (The drums may have been empty.) No environmental sampling has been conducted at these units to date.

A limited subsurface soil sampling program is proposed for this area, since the presence of significant contamination associated with the SWMUs making up Study Area 3 has not been established. (The surface in this area is covered with gravel. Because Study Area 3 is capped, its partial presence in the 100-year floodplain has no significant influence on contaminant transport and the sampling program.) This program will be roughly equivalent to the Verification Investigation procedure cited in the Allied Frankford RCRA Corrective Action Permit. The need for further investigation (groundwater plume or further source delineation) in this area will be determined based on an analysis of Phase I RFI results. If no significant contamination is found at the units in Study Area 3, "no further action" determinations will be sought from the USEPA.

For the Study Area 3 investigation during Phase I, a predetermined number of soil borings will be advanced to the groundwater table (or bedrock, if encountered before groundwater). Soil samples will be obtained continuously using a split-spoon sampler. One (unsaturated soil) sample per boring will be submitted for chemical analysis. Samples will be collected directly from the split spoon. The samples selected for chemical analysis will be based on visual observations and field screening with a photoionization detector (HNU). If visual contamination or positive HNU readings are observed, in a soil horizon, that horizon will be sampled. If no visually contaminated soil is encountered or positive HNU readings observed, the sample interval will be selected at the field geologist's discretion.

Because the exact location of the Dephenolizer I unit is not readily evident today (it has been dismantled and the area capped by gravel), five test borings are proposed for this area. Each new boring location will be sited in the field, based on observations made at the previous borings. Tentative boring locations are shown on Figure 2-1. Similarly, the Naphthalene Tank Bottoms area is not readily evident today; this area is currently covered by gravel. However, since the general location is known and the areal extent of the unit is relatively small, only three excavations are proposed for this unit.

The soil samples will be analyzed for TCL volatiles and semivolatiles, as well as TOC and pH (field analysis). Additionally, the analytical laboratory will look for cumene and AMS during the volatile analysis. The rationale for the TOC analysis is the same as stated above for Study Area 2.

One of the Study Area 3 borings will be advanced to bedrock to facilitate cross-section preparation. One saturated and one unsaturated soil sample from the boring will be analyzed for grain size distribution.

Additional details regarding the proposed analyses for the soil samples obtained from Study Area 3 during Phase I are provided in Section 3.0. The general drilling and sampling procedures for the test borings are presented in Section 4.0.

2.5 STUDY AREA 4 APPROACH

Study Area 4 consists of the Existing Nonhazardous Waste Drum Storage Area (SWMU 2), Past Drum Storage Facility C (SWMU 3), and Past Drum Storage Facility E (SWMU 5). Drummed wastes were stored in the open in these units, on top of a paved or graveled surface. No known releases from these units have occurred. No environmental samples have been collected at these units to date.

Since no known contamination associated with Study Area 4 has been identified, a limited subsurface soil sampling program for this area is proposed. (The surface in this area is partially covered with asphalt and partially covered with gravel.) This program will be roughly equivalent to the Verification Investigation procedure cited in the Allied Frankford RCRA Corrective Action Permit. The need for further investigation (groundwater plume or further source delineation) in this area will be determined based on an analysis of Phase I RFI results. If no significant contamination is found at the units in Study Area 4, "no further action" determinations from the USEPA will be sought.

In Study Area 4, the Phase I RFI program will consist of a predetermined number of soil borings being advanced to the groundwater table (or bedrock, if encountered first). Soil samples will be obtained continuously using a split-spoon sampler. One (unsaturated soil) sample per boring will be collected for chemical analysis. Samples will be collected directly from the split spoon. The samples selected for chemical analysis will be based on visual observations and field screening with an HNU. If visual contamination or positive HNU readings are observed, that soil horizon will be selected for analysis. If no unusual intervals are encountered, the sample interval will be selected at the field geologist's discretion.

For the Phase I RFI, three test borings are proposed per drum storage area . The boring locations will be determined in the field, based on observations made in previous borings.

The soil samples will be analyzed for TCL volatiles and semivolatiles; pH (field analysis); and TOC. Additionally, the analytical laboratory will look for cumene and AMS during the volatile analysis. The rationale for the TOC analysis is the same as stated above for Study Area 2.

One of the Study Area 4 borings will be advanced to bedrock (see Figure 2-1) to facilitate cross-section preparation. One saturated and one unsaturated soil sample from this boring will be analyzed for grain size distribution.

Section 3.0 provides details regarding the proposed analyses for the soil samples obtained from Study Area 4. The general excavation and sampling procedures for the test borings are presented in Section 4.0.

TABLE 3-1

SUMMARY OF SAMPLING AND ANALYSIS PROGRAM
ALLIED FIBERS FRANKFORD PLANT
PHILADELPHIA, PENNSYLVANIA

Matrix	Analysis	Data Use (A)	Target Detection Limit	Proposed Analytical Method	Source of Analysis	Number of Samples	Field Duplicates (B)	Equipment (Rinsate) Blanks (C)	Field Blank (E)	Trip Blank (F)
STUDY AREA 1										
Groundwater	TCL Volatiles (G) Semivolatiles, and Pesticide/PCBs	1,2,3,4	Per Method	CLP SOW 3/90	Laboratory	3	1	1	1	1
	TAL Metals	1,2,3,4	Per Method	CLP SOW 3/90	Laboratory	6 (D)	1	1	1	0
	Organophosphorus Pesticides	1,2,3,4	Per Method	SW-8140	Laboratory	3	1	1	1	0
	Herbicides	1,2,3,4	Per Method	SW-8150	Laboratory	3	1	1	1	0
	Dioxin Screen	1,2,3,4	Per Method	SW-8270	Laboratory	3	1	1	1	0
	TOC	1,5	Per Method	SW 9060	Laboratory	3	1	1	1	0
	pH	1,5	NA	NA	Field	3	0	0	0	0
	Specific Conductance	1,5	NA	NA	Field	3	0	0	0	0
	Temperature	1,5	NA	NA	Field	3	0	0	0	0
	Oxidation-Reduction Potential (Eh)	1,5	NA	NA	Field	3	0	0	0	0
	Dissolved Oxygen	1,5	NA	NA	Field	3	0	0	0	0
Soil	Grain Size Distribution	1,3,4,5	NA	ASTM D422*	Laboratory	2	0	0	0	0
STUDY AREA 2										
Soil	TCL Volatile Organics (G)	1,2,3,4	Per Method	CLP SOW 3/90	Laboratory	40	2	2	2	10
	TCL BNA Extractables	1,2,3,4	Per Method	CLP SOW 3/90	Laboratory	40	2	2	2	0
	TOC	1, 5	Per Method	SW 9060	Laboratory	40	2	0	0	0
	pH	1,5	NA	NA	Field	40	0	0	0	0
	Grain Size Distribution	1,3,4,5	NA	ASTM D422	Laboratory	4	0	0	0	0

TABLE 3-1
SUMMARY OF SAMPLING AND ANALYSIS PROGRAM
ALLIED FIBERS FRANKFORD PLANT
PHILADELPHIA, PENNSYLVANIA
PAGE TWO

Matrix	Analysis	Data Use (A)	Target Detection Limit	Proposed Analytical Method	Source of Analysis	Number of Samples	Field Duplicates (B)	Equipment (Rinsate) Blanks (C)	Field Blank (E)	Trip Blank (F)
STUDY AREA 3										
Soil	TCL Volatile Organics (G)	1,2,3,4	Per Method	CLP SOW 3/90	Laboratory	8	1	1	1	4
	TCL BNA Extractables	1,2,3,4	Per Method	CLP SOW 3/90	Laboratory	8	1	1	1	0
	TOC	1, 5	Per Method	SW 9060	Laboratory	8	1	0	0	0
	pH	1,5	NA	NA	Field	8	0	0	0	0
	Grain Size Distribution	1,3,4,5	NA	ASTM D422	Laboratory	2	0	0	0	0
STUDY AREA 4										
Soil	TCL Volatile Organics (G)	1,2,3,4	Per Method	CLP SOW 3/90	Laboratory	9	1	1	1	4
	TCL BNA Extractables	1,2,3,4	Per Method	CLP SOW 3/90	Laboratory	9	1	1	1	0
	TOC	1,5	Per Method	SW 9060	Laboratory	9	1	0	0	0
	pH	1,5	NA	NA	Field	9	0	0	0	0
	Grain Size Distribution	1,3,4,5	NA	ASTM D422	Laboratory	2	0	0	0	0

TABLE 3-1
SUMMARY OF SAMPLING AND ANALYSIS PROGRAM
ALLIED FIBERS FRANKFORD PLANT
PHILADELPHIA, PENNSYLVANIA
PAGE THREE

* Sieve only

(A) 1 - Site Characterization
2 - Risk Assessment
3 - Evaluation of Alternatives
4 - Engineering Design of Alternatives
5 - Input for Contaminant Transport Evaluation

(B) Field Duplicate - A single sample split into two portions, each of which is submitted blindly to the laboratory. Assesses the overall precision of sampling and analysis program (also known as a Replicate Sample).

(C) Equipment Blank - Sample obtained by pouring analyte-free, deionized water through sample collection equipment (e.g., bailer) before use. Assesses the effectiveness of decontamination procedure.

(D) Filtered and unfiltered samples will be analyzed for metals.

(E) Field Blank - Generated at time of sampling by filling bottles in the field with analyte-free, deionized water.

(F) Trip Blank - Trip blanks are prepared prior to the sampling event in the actual sample containers and are kept with the investigation samples throughout the sampling event. Trip blanks must be submitted with each batch of samples submitted for VOA analysis. They are used to monitor the loss (or gain) in the VOA fraction associated with routine sample handling.

(G) In addition to TCL VOAs, alpha-methyl styrene and cumene need to be quantified.

CLP Contract Laboratory Program

NA Not Applicable.

SW Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846.

ASTM American Society for Testing of Materials

BNA - Base/Neutral/Acid

Note: Allied reserves the right to collect additional quality control samples beyond those shown on this table.

- Presence of sediment in the well.
- Depth to groundwater.
- Total depth of the well.
- Identification and depth determination of any obstructions within the well.

A record of all field procedures, tests, and observations will be recorded in a field notebook. Annotated sketches will be drawn, if appropriate.

4.2.3 Drilling Operations

4.2.3.1 Overburden Drilling Procedures

Drilling operations for monitoring well and soil borings will be conducted in accordance with NUS SOP GH-1.4 (see Appendix A), using any combination of drilling methods needed to drill through the sediments; with the only restriction being that potable water is the only fluid allowed if one is required. The preferred methods used to advance borings for monitoring well installation, where no soil samples are collected for chemical analysis, are hollow stem augering and/or drive and wash, based on geologic conditions as determined by the site geologist. The preferred method of drilling test borings for collecting soil samples for visual or chemical analysis is the hollow-stem auger method. The use of drilling fluids will not be allowed for the test borings. The borings shall be advanced in accordance with the drilling specifications developed for this project. All borings not converted to monitoring wells will be backfilled over the entire length with a cement grout. Drill cuttings will be collected and disposed by Allied (see Section 4.2.8).

Five of the borings drilled to collect soil samples will be advanced to bedrock, at an estimated depth of 40 feet. The remaining borings drilled to collect soil samples will range in depth from 5 to 15 feet, based on topography and depth to the water table. Boring depths for monitoring wells will range from approximately 10 to 25 feet, with an estimated average of 17 feet. The actual depth for each well boring will be determined by the site geologist, who will choose the lithologic interval displaying the most favorable aquifer flow characteristics. The depth of the water table will be measured and/or confirmed by the site geologist prior to well completion.

During drilling operations, Standard Penetration Tests and split-barrel sampling will be performed continuously for soil borings where soil samples are collected for visual or chemical analysis (test borings) and at nominal 5-foot intervals for those borings where soil samples are collected solely for lithologic description (monitoring well borings), or as determined by the field geologist. These sampling procedures shall be performed in accordance with ASTM D1586-84 (see Appendix A),

modified to obtain sufficient soil for chemical analysis by using a 3-inch outside diameter, split-barrel sampler driven with a 300-pound hammer.

TABLE 4-1

SUMMARY OF ANALYSES, BOTTLE REQUIREMENTS, PRESERVATION REQUIREMENTS, AND HOLDING TIMES
ALLIED FIBERS FRANKFORD PLANT
PHILADELPHIA, PENNSYLVANIA

Media	Analysis	Number of Samples	No. of Containers per Sample[1]	Type of Container	Preservation Requirements	Holding Time[2]
STUDY AREA 1						
Groundwater	Volatile Organics	7	3	40-ml VOA vials	HCl to pH<2 Cool to 4° C	14 days
	BNA extractables, Pesticides/PCBs, Herbicides, Organophosphorus Pesticides	6	8	1-liter amber glass bottles	Cool to 4° C	7 days until extraction, 40 days after extraction
	Dioxin Screen	6	2	1-liter amber glass bottles	Cool to 4° C	7 days until extraction, 40 days after extraction
	Metals	9	1	1-liter polyethylene bottle	HNO_3 to pH<2 Cool to 4° C	6 months; Hg - 28 days
	TOC	6	1	500- ml polyethylene bottle	H_2SO_4 or HCl to pH<2 Cool to 4° C	28 days
Soil	Grain Size Distribution	2	1	4-ounce, wide-mouth glass jar	None	None
STUDY AREA 2						
Soil	Volatile Organics	56	3	4 ounce, wide-mouth glass jar	Cool to 4° C	7 days
	BNA Extractables	46	1	8-ounce, wide-mouth glass jar	Cool to 4° C	7 days until extraction, 40 days after extraction
	TOC	42	1	8-ounce, wide-mouth glass jar	Cool to 4° C	28 days
	Grain Size Distribution	4	1	4-ounce, wide-mouth glass jar	None	None

TABLE 4-1
SUMMARY OF ANALYSES, BOTTLE REQUIREMENTS, PRESERVATION REQUIREMENTS, AND HOLDING TIMES
ALLIED FIBERS FRANKFORD PLANT
PHILADELPHIA, PENNSYLVANIA
PAGE TWO

Media	Analysis	Number of Samples	No. of Containers per Sample	Type of Container	Preservation Requirements	Holding Time
STUDY AREA 3						
Soil	Volatile Organics	15	3	4-ounce, wide-mouth glass jar	Cool to 4° C	7 days
	BNA Extractables	11	1	8-ounce, wide-mouth glass jar	Cool to 4° C	7 days until extraction, 40 days after extraction
	TOC	9	1	8-ounce, wide-mouth glass jar	Cool to 4° C	28 days
	Grain Size Distribution	2	1	4-ounce, wide-mouth glass jar	None	None
STUDY AREA 4						
Soil	Volatile Organics	16	3	4-ounce, wide-mouth glass jar	Cool to 4° C	7 days
	BNA Extractables	12	1	8-ounce, wide-mouth glass jar	Cool to 4° C	7 days until extraction, 40 days after extraction
	TOC	10	1	4-ounce, wide-mouth glass jar	Cool to 4° C	28 days
	Grain Size Distribution	2	1	4-ounce, wide-mouth glass jar	None	None

(1) Additional containers will be required for matrix spike/matrix spike duplicate samples.
(2) Holding times shown are from the date of sample collection.

TABLE 7-1

**ANALYTICAL METHODS FOR CHEMICAL PARAMETERS
ALLIED FIBERS FRANKFORD PLANT
PHILADELPHIA, PENNSYLVANIA**

Analytical Parameter	Solid Matrix Analytical Method and Preparation Method	Aqueous Matrix Analytical Method and Preparation Method
Volatile Organics	CLP SOW 3/90	CLP SOW 3/90
BNA Extractables	CLP SOW 3/90	CLP SOW 3/90
Metals	-	CLP SOW 3/90
Pesticides and PCBs	-	CLP SOW 3/90
Herbicides	-	SW 8150
Organophosphorus Pesticides	-	SW 8140
Dioxin Screen	-	SW 8270
TOC	SW 9060	SW 9060
Grain Size Distribution	ASTM D422	--

SW - EPA, 1986c. "Test Methods for Evaluating Solid Wastes - Physical/Chemical Methods," 3rd Edition.
CLP SOW - USEPA Contract Laboratory Program Statement of Work
ASTM - American Society for Testing of Materials.

Matrix Spikes

One in ten samples analyzed for a specific parameter is spiked with the analyte each day, for those parameters for which a stable standard is available. An aliquot of standard solution is added to the sample.

9.2.7 TOC

The quality control procedures for total organic carbon (TOC) analysis are summarized in Table 9-1.

9.2.8 Grain Size Distribution

The quality control procedures for grain size distribution analysis are summarized in ASTM Method D422.